

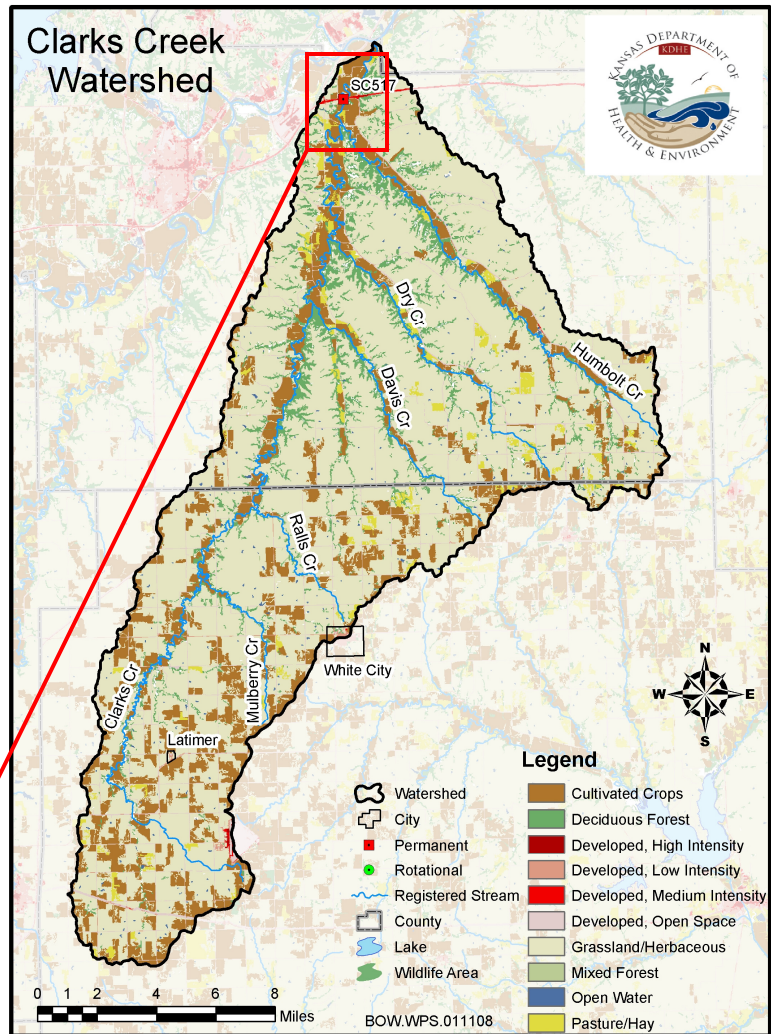
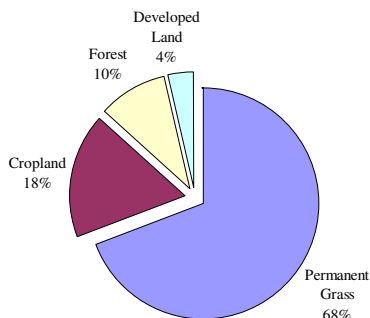
Clarks Creek Watershed Fact Sheet

Watershed:

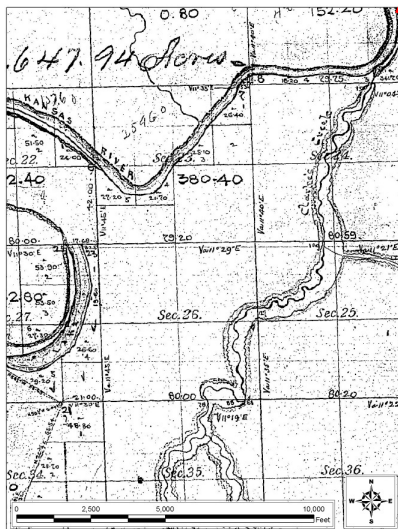
Clarks Creek drains a 247 square mile watershed in the northern Flint Hills ecoregion, south and east of Junction City. Portions of 16 townships are included in the drainage area. This watershed includes Clarks, Humbolt, Davis, Dry, Mulberry and Ralls Creeks. The watershed is nearly evenly split north-south by Geary and Morris counties. Only two municipal boundaries are included in the watershed, Latimer and a portion of White City. The overall population of the watershed is 1,439 people.

Land Use:

The Clarks Creek watershed is predominantly covered in perennial grasses, as is typical for Flint Hills watersheds. Other major uses include cultivated cropland, some forested areas near streams and a small amount of developed land, primarily roads. Cultivated cropland is generally in one of two areas, with patchy cropland uses in the southern end of the watershed and extensive cropland uses along the alluvial valley of the perennial streams in the area.



Land cover information from the 2001 National Land Cover Dataset. www.mrlc.gov



Lower Clarks Creek as surveyed in 1857. The area marked on each side of the creek is the extent of the riparian forest present at that time.

Historical Change:

Clarks Creek was settled beginning in the 1850's. When the General Land Office surveyed section lines in the area in 1857 they noted a wide riparian area marked on their maps as a corridor along Clarks Creek.

The riparian corridor was 200-900' wide along the lower reaches of Clarks and Humbolt Creek, as visible in this map. While remnants of this wooded area are still present, the average width of the riparian forest has shrunk considerably.

Much of the area that was forested in the 1857 survey is now under production as row crops, and in some areas no buffer zone is present between the streams and cropland.

TMDL Dictionary:

E. coli- *Escherichia coli*, a bacteria typically associated with fecal material that can cause serious gastrointestinal illness in people. *E. coli* replaced fecal coliform in the Kansas Water Quality Standards in 2002.



Image courtesy of Rocky Mountain National Laboratory National Institutes of Health

303(d) Listing- Any stream, river, lake or wetland that is unable to meet water quality standards, but has not had a TMDL established yet.

TMDL- Total Maximum Daily Load, the flow adjusted maximum amount of a pollutant that can be present in a waterbody while still supporting designated uses.

Riparian- The zone along a stream, particularly the areas characterized by vegetation that requires larger quantities of water, such as trees, and are resistant to flooding damage. Stable riparian areas can provide resistance to bank erosion and refuge for many animal species.

Water Quality:

Overall water quality in Clarks Creek ranges from moderate to poor. In 2000 a TMDL was established for excessive fecal coliform bacteria concentrations. Since the 2002 adoption of the new water quality standard for *E. coli* little evidence of a bacteria impairment has been observed. Summertime bacteria concentrations are generally less than the 427 cfu/100 mL limit for streams with restricted public access. There are currently no 303(d) listings for Clarks Creek.

Spring and summer nutrient and sediment concentrations generally exceed desirable levels, with the largest problems from springtime phosphorus concentrations. Phosphorus is typically bound to sediment, so reductions in sediment are likely to result in reductions of phosphorus.

Water quality in Clarks Creek is generally poorer than most other grassland Flint Hills streams in the Mid-Upper Kansas region. *E. coli* concentrations are generally in-line with levels observed in other grassland watersheds, like the streams in Wabaunsee County.

Fast Facts

Excessive sediment can clog gills in filter breathers, like fish and many macroinvertebrates.

Sediment is strongly associated with phosphorus, which can promote algae growth, leading to unsightly blooms, taste and odor problems, and even fish kills at large concentrations.

Eroding streambanks and poor conservation practices can both result in sediment loading in streams.

Bank trampling by livestock can lead to unstable streambanks, as well as direct inputs of nutrients to streams.

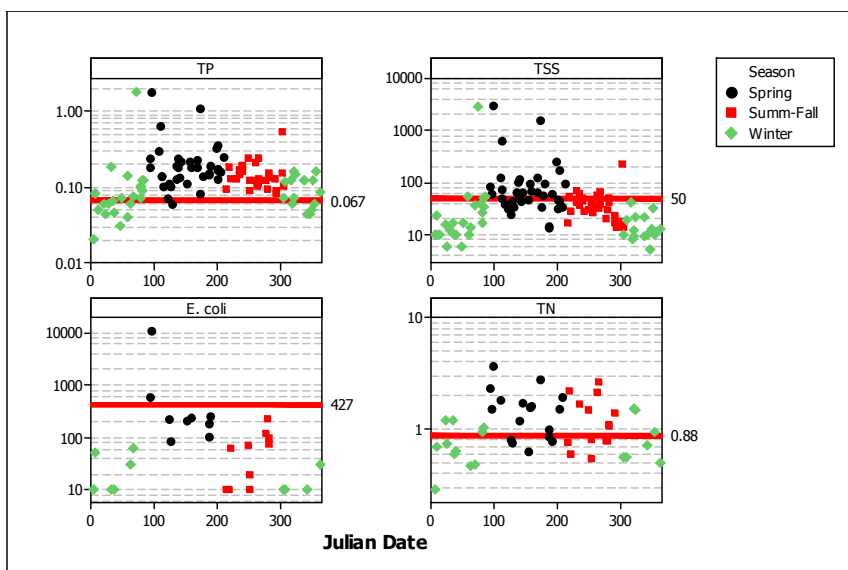
Provision of alternative watering sites can reduce livestock impacts.

TCE has been found in groundwater near the old Herrington Army Air Field, but does not currently threaten surface waters in this area.

Ranking Among Upper & Middle Kansas Streams

Stream	TP (mg/l)	Stream	TSS (mg/L)
Shunganunga	0.236	Upper Soldier	70
Wildcat	0.185	Cross	40
Upper Vermillion	0.136	Lower Vermillion	38.5
Clarks	0.1265	Shunganunga	38
Muddy	0.121	Lower Soldier	35
Rock	0.12	Muddy	35
Lower Soldier	0.1155	Rock	35
Upper Soldier	0.111	Clarks	34
Cross	0.1045	Upper Vermillion	34
McDowell	0.104	Wildcat	30
Little Soldier	0.101	Lower Mill	29
Lower Vermillion	0.095	Mission	28
Mission	0.07	McDowell	26
Lower Mill	0.066	Deep	25
Deep	0.065	Little Soldier	24
WB Mill	0.05	WB Mill	13
Middle Mill	0.0435	Middle Mill	10.5
Illinois	0.021	Illinois	10
Nehring	0.02	Nehring	10

Stream	(cfu/100 mL)	Stream	TN (mg/L)
Rock	395	Shunganunga	1.19
Little Soldier	393	Cross	1.031
Muddy	391	Clarks	1.01
Mission	305	Upper Soldier	0.9975
Shunganunga	189	Rock	0.9245
Wildcat	175	Lower Soldier	0.893
Upper Soldier	153	Upper Vermillion	0.89
Cross	121	Little Soldier	0.8835
Lower Soldier	109	Muddy	0.8585
Upper Vermillion	108	Mission	0.847
Deep	98	Lower Vermillion	0.799
Lower Vermillion	80	Wildcat	0.658
Nehring	75	McDowell	0.64
Clarks	63	Lower Mill	0.575
McDowell	47	Nehring	0.513
Lower Mill	40	Deep	0.497
Illinois	31	WB Mill	0.404
Middle Mill	10	Middle Mill	0.3895
WB Mill	10	Illinois	0.27



	TP Median	TSS Median	Turbidity Median	TOC Median	Kjeldahl Median	<i>E. coli</i> Median	TN Median
Overall	0.1265 (106)	34 (107)	13 (107)	3.776 (42)	0.53 (49)	63 (29)	1.01 (49)
Spring	0.176 (36)	62 (37)	27 (37)	5.688 (15)	0.825 (17)	231 (9)	1.529 (17)
Summ-Fall	0.13 (31)	35 (31)	13 (31)	3.105 (13)	0.569 (14)	68 (10)	1.091 (14)
Winter	0.074 (39)	13 (39)	5.85 (39)	3.3565 (14)	0.3715 (18)	10 (10)	0.7105 (18)

More Information

Watershed Restoration and Protection (www.kswraps.org)

Total Maximum Daily Loads (www.kdheks.gov/tmdl)

Kansas Water Quality

(www.kdheks.gov/befs/water_quality_disclaimer.htm)



Eroding streambanks, like the one seen above on Clarks Creek, can contribute sediment and nutrients to a stream. Poorly buffered cropland is an important source of these pollutants to a stream. Aerial imagery courtesy of the 2006 National Agricultural Imaging Program.

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